International Journal of Research in Engineering, Science and Management
Volume-3, Issue-2, February-2020
www.ijresm.com | ISSN (Online): 2581-5792

An Advance Ambulances Rescue System Using Priotozed Traffic Switching Using IoT

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***Abstract*: There is loss of life as a result of the delay within the arrival of ambulance to the hospital within the golden hour. This delay is especially caused by the waiting of the ambulance within the traffic signals. The most themes behind this theme is to produce a sleek flow for the emergency vehicles like ambulance to succeed in the hospitals in time and therefore minimizing the delay caused by traffic jam. The thought behind this theme is to implement ARSPTS which might management automatically the traffic lights within the path of the ambulance. The ambulance is controlled by the control unit that furnishes adequate route to the ambulance and conjointly controls the stoplight in step with the ambulance location and therefore reaching the hospital safely. The controller identifies the situation of the accident spot through the measuring system within the vehicle and therefore the controller walks through the ambulance to the spot. This theme is totally ambulance -controlled, therefore it finds the accident spot, controls the traffic lights, serving to succeed in the hospital in time.**

***Keywords*: Pic microcontroller, IoT Technology, GPS module, GSM module, RFID card, RID reader.**

1. Introduction

This project is designed to avoid loss of human lives in accident due to lack of hospital services. In this project each vehicle consists one unit in which GPS and GSM is used. One accident detector switch is placed to sense accident. There are many methods to detect accident such as glass break detector or sudden change in vehicle speed. When accident happens GPS module takes latitude and longitude position and sends it to ambulance module through GSM module. Using this latitude and longitude ambulance can track accident position. Ambulance can control traffic signal to avoid getting late to hospital. For this purpose, RF communication is used between ambulance and traffic signal. When ambulance comes closer to signal it can control traffic signal.

Emergency occurs anywhere at any location, at any time, and in various ways will make one at risk. These situations require a speedy response. So it is very crucial and important to establish direct, fast and efficient technique without delay. With the increasing number of population in the metropolitan areas already existing problem of poor traffic congestion has grown to an alarming event. This problem has to be properly analyzed and the appropriate measures have to be taken. Often rural areas are devoid of the traffic congestion. The proper care is to be given to the urban areas mainly focusing on to the metropolitan cities. Even if each and every vehicle passing through the traffic has its own need, the prior importance is given to the Ambulance and other emergency vehicles which needs to wait longer time on the traffic thereby increasing the probability of risk. Transportation of a patient to hospital in emergency seems quite simple but in actual it is pretty difficult during peak hours. Optimum utilization of the time after an accident is actually the golden hours as a measure of effectiveness of an emergency response service provider system. Recovery action should be taken immediately. Congestion can be solved to an extent. In addition to this, in the case of giving prior importance to the ambulance and other emergency vehicles, their chances of misusing the vehicles by some people for their own benefit is very high. The older technology uses RF transmitter is mounted on atop of the ambulance and RF receivers are placed in every road leading to the signal at a suitable distance from the traffic signal. Initially the driver of the ambulance switches on the transmitter through a switch placed on the steering wheel. This makes the receiver output to go high and thereby interrupting the microcontroller. At the beginning of the interrupt sub routine, all the port pins are scanned to determine in which lane the ambulance is approaching and the corresponding lane is made green. In order to tackle these problems, this paper has come up with a proposed system using the advanced GPRS Technologies for faster data transmission. The ambulance is controlled by the control unit and also controls the traffic light according to the ambulance location and thus reaching the hospital safely.

2. System design and details

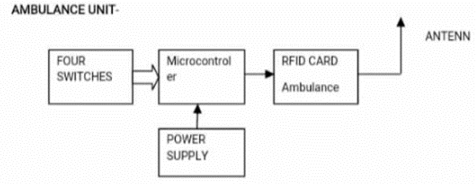
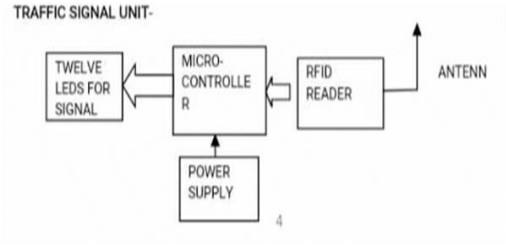


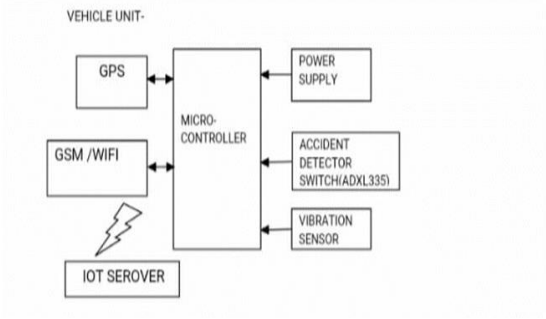
Fig. 1. Block diagram of system design



3. Working

RF communication. Thereby the ambulance is recommended to reach the hospital in time.

- *Vehicle unit*- The centre part of this project is micro controller PIC16f690. At vehicle unit GPS and GSM modules are interfaced with controller. Battery of 12V is used to power the unit. Ambulance unit- Here RF transmitter is present. Encoder is used convert parallel input to serial output. 9V battery is used to power this unit.
- *Traffic signal unit*- Here RF receiver receives data from ambulance and according action it takes. Twelve LEDs are provided for signalling purpose.



4. System implementation

Our system consists of three main units, which coordinates with each other and makes sure that ambulance reaches the hospital without any time lag. Thus our system is divided into following three units,

- The Vehicle Unit
- The Ambulance/control Unit
- Traffic unit

A. Vehicle unit

The vehicle unit installed in the vehicle senses the accident and sends the location of the accident to the controller through IOT. According to our system, every vehicle should have a vehicle unit. The vehicle unit consists of a vibration sensor, controller, siren, a user interface, GPS system and a GSM module. The vibration sensor used in the vehicle will continuously sense for any large scale vibration in the vehicle [1]. The sensed data is given to the controller GPS SYSTEM inside the vehicle. The GPS SYSTEM finds out the current position of the vehicle (latitude and the longitude) which is the location of the accident spot and gives that data to the GSM MODULE AND WEB serover. The GSM MODULE sends this data to the control unit whose GSM number is already there in the module as an emergency number.

B. Ambulance unit

The controller finds the nearest ambulance to the accident spot and also the shortest path between the ambulance, accident spot and the nearest hospital. The controller then sends this path to the ambulance. Also using this information, the controller controls all the traffic signals in the path of ambulance and makes it ready to provide free path to ambulance, which ensures that the ambulance reaches the hospital without delay. At the same time, the ambulance unit turns ON the RF transmitter. This will lead to communicate with the traffic section.

C. Traffic unit

Whenever traffic signal section receives the information about accident, the RF receiver in this section is turned ON to search for ambulance nearing the traffic signal. Whenever the ambulance reaches near to the traffic signal (approximately 100m), the traffic signal will be made to green through RF communication. Thereby the ambulance is recommended to reach the hospital in time.

D. Sensor's

1) Vibration Sensor SW-18020P

Can be used in variety of vibration detection projects. The two contacts of sensor are not connected in idle condition. When external force is acted upon either my movement or vibration, the sensor's two contact pin are closed and contact is made between the two pins. When the force is removed the sensor terminals returns back to open contacts.

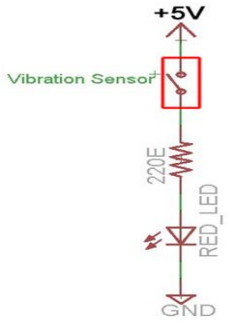


Fig. 4. Vibration sensor

2) Flex sensor (Bend Sensor)

Flex sensor also called as bend sensor detects bend in one direction. These sensors are easy to use; they are basically resistors that change value based on how much their flexed. If

they're unflexed, the resistance is about ~10KΩ. When flexed all the way the resistance rises to ~20KΩ. Very easy to use just connect a pull up or a pull down resistor and you will get analog output which will vary according to how much they are bent. Can then be easily connected to Arduino or any other micro-controller.

3) GSM

GSM (global system for mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services. GSM is a global system for mobile communication is mostly used for sending or Receiving data such as voice and message. In this security system GSM plays an important role. GSM supports voice calls and data transfer speeds of up to 9.6 kbit/s, together with the transmission of SMS (short message service).

E. Advantages

- Totally advanced version of ambulance system.
- The ambulance would be able to cross all the traffic junctions without waiting.
- With the help of GPS we get the latitude and longitude of detected position.

F. Application

- Anti-theft systems
- Crash recorders
- Dead reckoning
- Bio-medical applications

5. Conclusion

Human life is very valuable one so they should be conscious and follow the safety measures. By using the smart ambulance system. We can change the traffic signal to green and control the traffic system. This method also reduces the cost. Many smart systems with IOT and sensor were developed for providing automated environment to human life. This will help the ambulance to save human life.

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